

Chapter 22: Heat Engines and the Second Law

- Ex:1 Calculate the efficiency of the following cycle: $P_1 = P_2 = 6 \text{ atm}$, $P_3 = P_4 = 1 \text{ atm}$, $V_4 = V_1 = 200 \text{ l}$ and $V_2 = V_3 = 500 \text{ l}$. There are 3 moles of a diatomic gas.
- Ex:2 Calculate the efficiency of a Carnot engine operating between 20° C and 660° C .
- Ex:3 A Carnot engine has a power output of 200 kw. If it operates between 300 K and 1200 K, how much energy is absorbed each minute and how much heat energy is lost each minute?
- Ex:4 What is the change in entropy when one mole of aluminum is melted? (melting point for aluminum is 660° C ; latent heat of aluminum is $3.97 \times 10^5 \text{ J/kg}$)
- Ex:5 What is the change in entropy when 20 grams of 10° C water is added to 40 grams of 100° C water?
- Ex:6 What is the change in entropy when 2 moles of a diatomic gas are heated isovolumetrically from 300 K to 400 K?
- Ex:7 What is the change in entropy when two moles of a polyatomic gas under go an isobaric compression from 200 l to 10 l if the initial temperature is 20° C ?